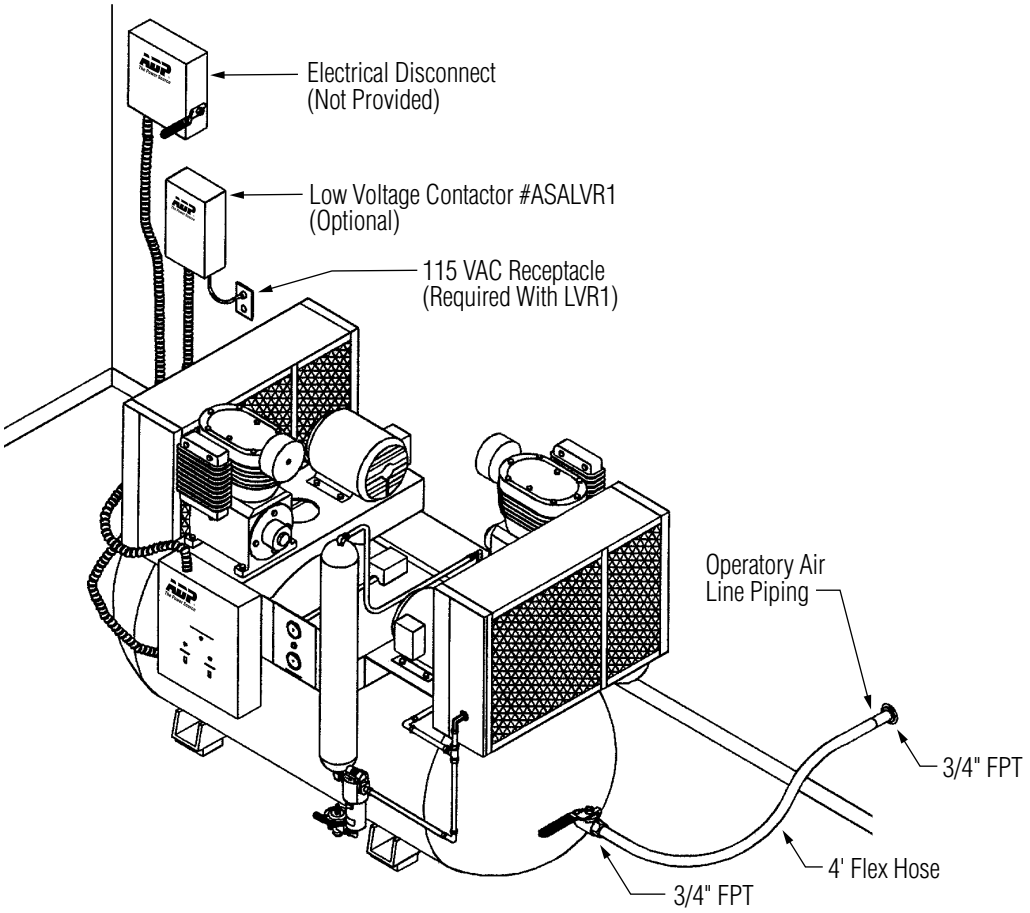
Installation Instructions

King-Air Compressor

Simplex and Duplex Desiccant Systems



This air compressor should only be installed by qualified personnel. Should any questions arise during installation, call ADP Technical Support between the hours of 6:00 a.m. to 4:00 p.m. (Pacific Standard Time).

Unpacking The System:

Place the compressor in a clean, dry, well-ventilated area, on a solid, level surface. Consider sound level and insulate as needed. Be sure that adequate insulation is available as the compressor is air-cooled. The pump package flywheel should be mounted with a minimum of 12-inch wall clearance to allow for proper air circulation. Ambient temperature in the equipment room should be within the temperature range of 40 degrees Fahrenheit (4° C) minimum to 100 degrees Fahrenheit (38° C) maximum.

1. Remove wood shipping frame.
2. Remove compressor from shipping skid.

Installing The Air Compressor:

1. Firmly support all four tank feet on the unit foundation. Shim tank feet as required for level operation to remove all stress from unit.
2. Check oil level. Full crankcase oil level is a bull's-eye "red dot" on oil gauge glass. Fill crankcase to full mark using SAE 30W non-detergent compressor oil only.
3. **Wiring Instructions:**
   (a) Have a certified electrician connect 208-230 Volt, 3 Phase, 60 Hertz service to the compressor starter panel. See recommended wire sizing chart below. (460V is available on request).
   (b) All AKC electrical panels are equipped with thermal overload manual reset, AC magnetic starters.

Recommended Wire And Breaker Size

Model	Total HP	Volts	Amps	Phase	Breaker Size
AKCSL50D	5.0	208-230	17.5	3	30
AKCSL75D	7.5	208-230	25.3	3	40
AKCSL100D	10.0	208-230	32.2	3	60
AKCSL150D	15.0	208-230	48.3	3	60
AKCTL60D	6.0	208-230	24.6	3	40
AKCTL100D	10.0	208-230	35	3	50
AKCTL150D	15.0	208-230	50.6	3	80

Note: Consult your local electrical code to be sure of proper wire size, overload current protection, and disconnect means.
Never Operate This Equipment Without Complete And Proper Grounding.

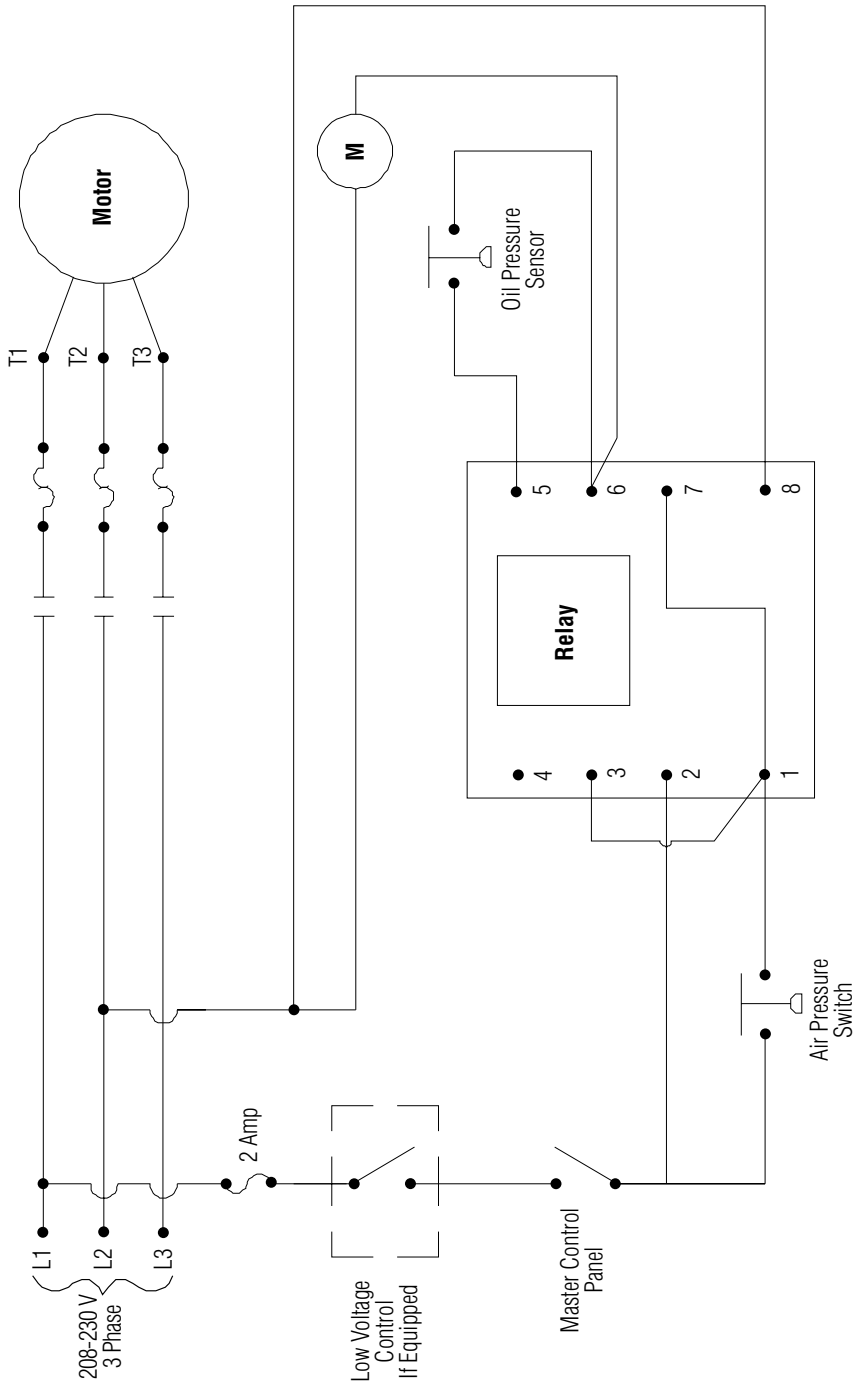
4. Complete piping connections from the operatory to the compressor storage tank outlet valve.
5. Make sure the compressor is level.
6. Insulate 3/8" poly-flow tubing at unloader valve outlet fitting below Ultrair Filter for sewer drain connection of condensate.

Simples Unit Start-Up:

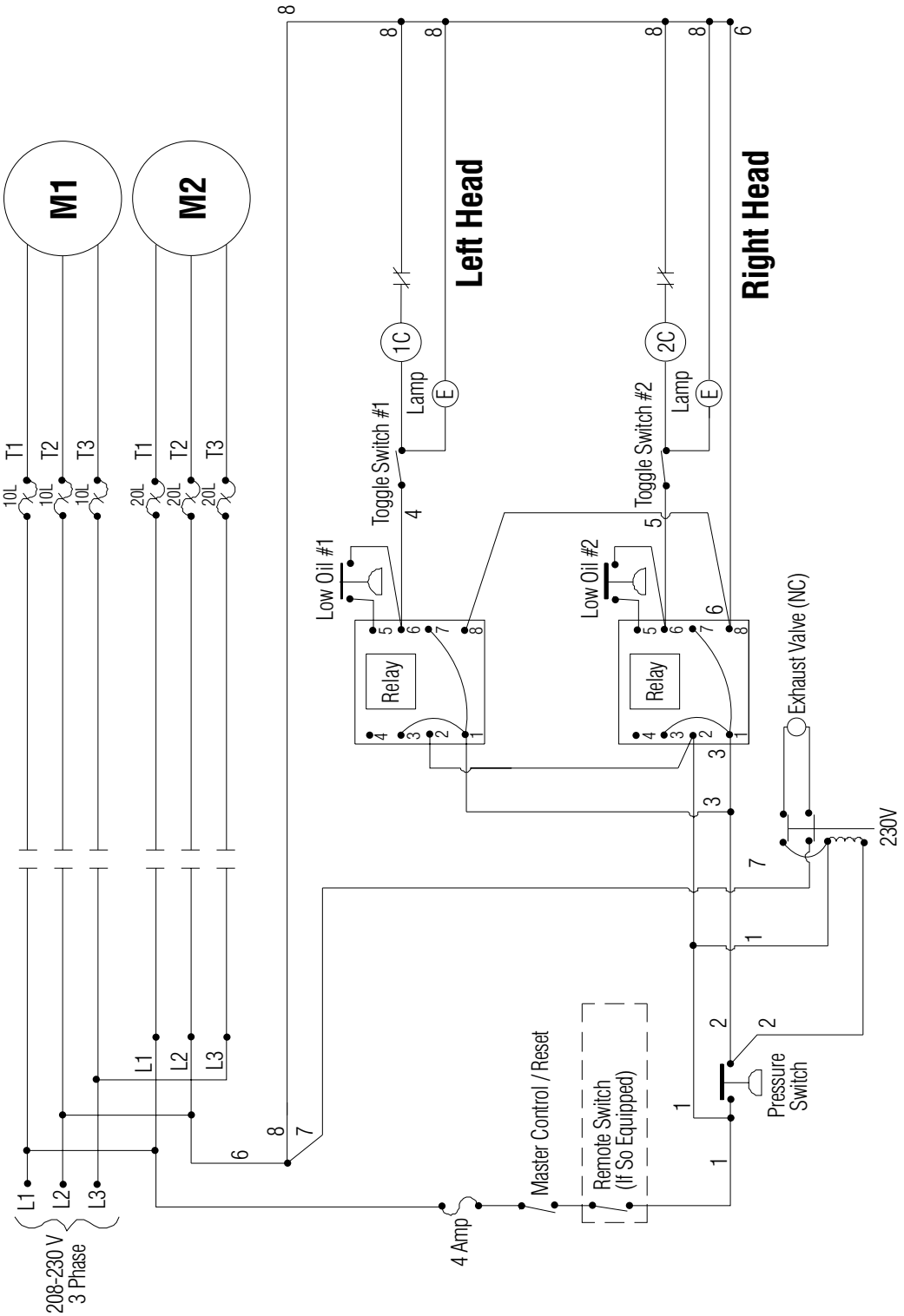
1. Close storage tank shut-off valve.
2. Turn master circuit panel power **"ON"** breifly and observe flywheel rotation.
3. **Check Compressor Flywheel For Proper Counter-Clockwise (CCW) Rotation Facing Flywheel.** If rotation is clockwise (CW) facing flywheel, reverse any two of the three motor leads to reserve rotation. Compressor should run quietly and storage tank should begin to pressurize.
4. Check compressor operating oil pressure. Minimum oil gauage pressure is 15 psi. Oil pressure failure switch supplied with this package will shut down compressor if oil-pressure should drop below 12 psi. **See Trouble-Shooting page 10 if unit experiences oil failure.**
5. Allow compressor to run until storage tank gauge registers 100 psi. The compressor should then automatically shut-off and begin automatic purge cycle. **See Compressor Operation on page 6.**
6. Check compressor package for any leaks using a soap and water solution applied to the plumbing joints. Tighten fittings and joint to close off any air leaks.
7. Pressure test the office air system piping for leaks. Use the storage tank pressure gauge to minitor line pressure drop. Open storage-tank shut-off valve slowly and allow air to flow into office air system. Check storage tank guage after twenty minutes. If pressure drop, an air leak exists.

   NOTE: Seal All System Air Leaks! Air Leaks Cause Compressor Failures!

Electrical Wiring Diagram - Single Compressor



Electrical Wiring Diagram - Duplex Compressor



Duplex Unit Startup:

1. Close storage tank shut-off valve.

2. Turn master control circuit panel power to **"ON"**.

3. **Check Compressor Flywheel For Proper Counter-Clockwise (CCW) Rotation Facing Flywheel.** If rotation is clockwise (CW) facing flywheel, reverse any two of the three motor leads to reserve rotation.

4. Switch compressor starter panel compressor toggle switches (Switch #1 and #2) momentarily and observe flywheel rotation.

5. Switch Master Control/Reset toggle switch to **"ON"**. Both compressors should run.

6. Check compressor operating oil pressure. Minimum oil gauage pressure is 15 psi. The oil pressure failure switch supplied with this package will shut down compressor if oil-pressure should drop below 12 psi. **See Trouble-Shooting page 10, if unit experiences oil failure.**

7. Allow compressor to run until storage tank gauge registers 100 psi. The compressor should then automatically shut-off and begin automatic purge cycle. **See Compressor Operation on page 6.**

   NOTE: This duplex packlage is desgned to run both heads simultaneously. DO NOT ALTERNATE HEADS.

8. Check compressor package for any leaks using a soap and water solution applied to the plumbing joints. Tighten fittings and joint to close off any air leaks.

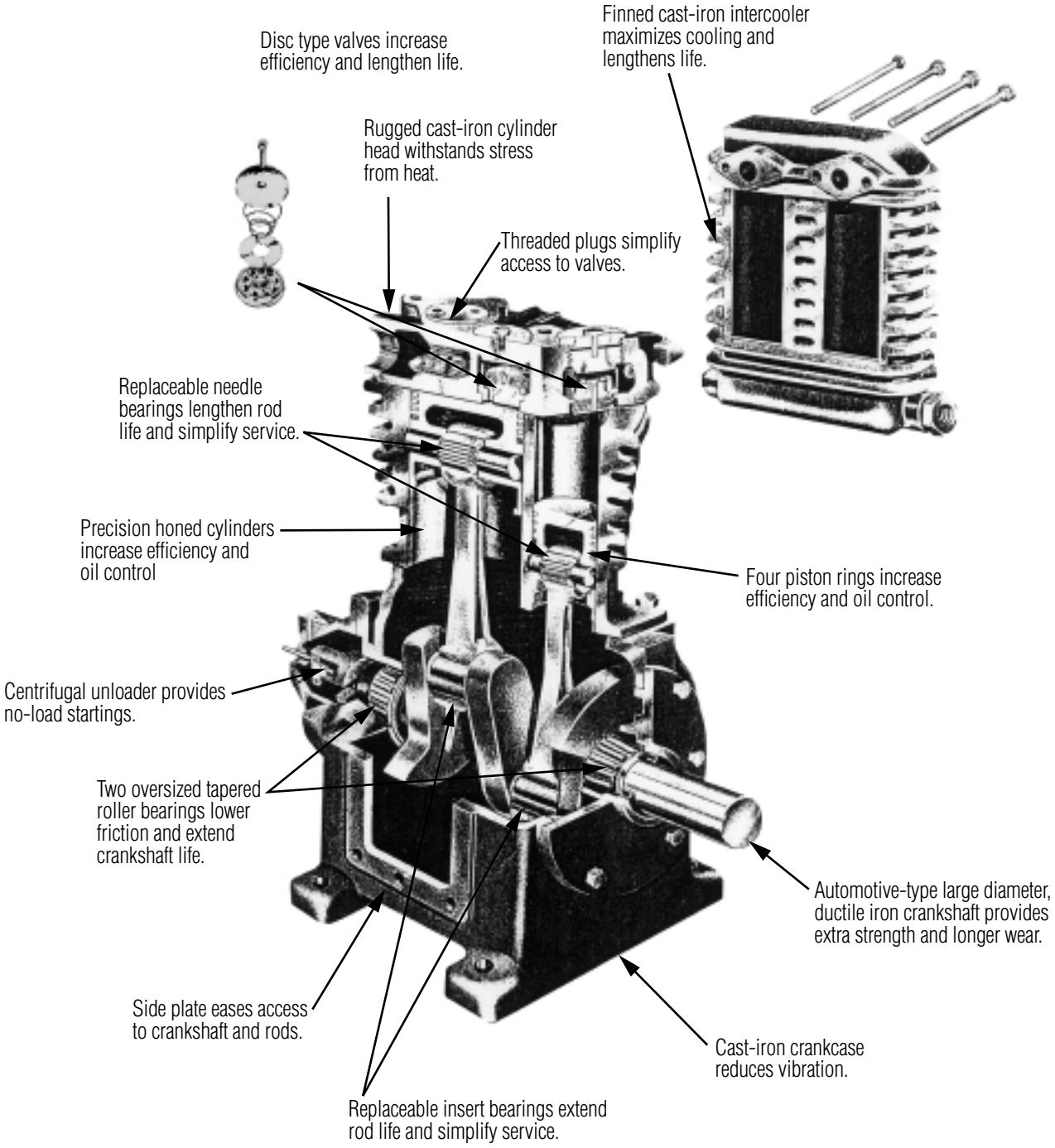
9. Pressure test the office air system piping for leaks. Use the storage tank pressure gauge to monitor line pressure drop. Open storage-tank shut-off valve slowly and allow air to flow into office air system. Check storage tank guage after twenty minutes. If pressure drop, an air leak exists.

   Note: Seal All System Air Leaks! Air Leaks Cause Compressor Failures!

A. Air Compressor Operation:

The Compressor

The Air Compressor employed by all ADP King-Air Compressor packages is a 2 stage belt-driven reciprocating design, pioneered by the Saylor-Beall Company. Since 1915, this heavy-duty cast iron compressor has been an industry standard. See cutaway view below.


Finned cast-iron intercooler maximizes cooling and lengthens life.
Disc type valves increase efficiency and lengthen life.
Rugged cast-iron cylinder head withstands stress from heat.
Threaded plugs simplify access to valves.
Replaceable needle bearings lengthen rod life and simplify service.
Precision honed cylinders increase efficiency and oil control
Four piston rings increase efficiency and oil control.
Centrifugal unloader provides no-load startings.
Two oversized tapered roller bearings lower friction and extend crankshaft life.
Automotive-type large diameter, ductile iron crankshaft provides extra strength and longer wear.
Side plate eases access to crankshaft and rods.
Cast-iron crankcase reduces vibration.
Replaceable insert bearings extend rod life and simplify service.

Compressor Cooling:
This compressor is air-cooled and requires an adequate air flow to prevent overheating. Cylinder and cylinder head cooling is provided by the crankshaft mounted compressor flywheel. All ADP lubricated compressor nuts are equipped with an air cooled aftercooler to cool hot discharge air.

Oil Pressure Failure Connection:
The oil circuit of this ADP Compressor is equipped with an oil pressure sensing device to shut down the compressor in the event of low oil pressure. The electrical circuit consists of a normally open pressure sensor and a **"one shot"** ten second time delay relay.

The operation of this safety circuit is quite simple. On compressor start-up, the time delay relay bypasses the oil pressure sensor for a ten second period; long enough to enable the compressor oil pump to develop full system oil pressure. After the ten second delay interval, the oil pressure sensor is switched into the electrical circuit to sense oil pressure. When oil pressure is maintained at 12.5 psi or more, the control circuit remains energized and the compressor is free to run the course of standard pump-up cycle. If at any time during pump-up the oil pressure should drop below 12.5 psi, the oil pressure sensor would open, de-energize the control circuit, and shutdown the compressor on oil-pressure failure.

The **"one shot"** feature incorporated in the time delay relay limits the control operation of the circuit to "one" oil pressure failure. This means the compressor cannot automatically re-start until the initiating electrical circuit is manually reset as described below.

Oil Pressure Failure Control Circuit Reset:
To reset the oil failure **"one shot"** time delay protection circuit, the Master Control/Reset toggle switch must be switched "OFF" and reset.

Note: Do not perform this reset procedure more than twice. If oil pressure cannot be maintained, serious damage to the compressor will occur. Consult the factory should this condition ever arise.

B. The Desiccant Drying System Unit Operation Coalescing Filter:

Coalescing Filter
The ADP Coalescing Filter (Ultrair Filter) is designed specifically for removing moisture and other contaminates from compressed air before it enters the Drying Chamber. The Ultrair Filter actually removes 99.9 percent of any oil discharged by an oil-lubricated air compressor, as well as large amounts of water. In addition to the condensate removal, the filter will remove particulate matter as small as 0.1 micron.

Drying Chamber
Upon exiting the Ultrair Filter, discharge air is free of oil vapor and large water droplets. The actual fine mist or moisture vapor drying then takes place as the air is directed from bottom to top in the Drying Chamber.

The Drying Chamber is internally coated with an anti-corrosive material. A stainless steel wire mesh screen supports the air drying media consisting of an activated alumina buffer bed and several pounds of silica gel (desiccant). Ultra-dry 40 degree Fahrenheit dew point air exits the top of the Drying Chamber.

Flow Control Valve
The Flow Control Valve is located at the top of the desiccant Drying Chamber. This valve reduces the pressure of the reflux purge air to atmospheric before it enters the Drying Chamber. Because air at atmospheric pressure is capable of holding more moisture than pressurized air, the Flow Control Valve makes its possible to remove moisture from the silica gel (desiccant) during the purge cycle operation.

Unloader Valve
The Solenoid Unloader Valve located below the Ultrair Filter opens and closes when the compressor cycles **ON** and **OFF**. While the compressor is running, air is directed through the Drying Chamber into the purge tank and storage tank. Pilot oil pressure/electricity keeps the unloader valve closed. When the compressor is not running, the purge air returns through the Drying Chamber and exits via the exhaust muffler attached to the Unloader Valve.

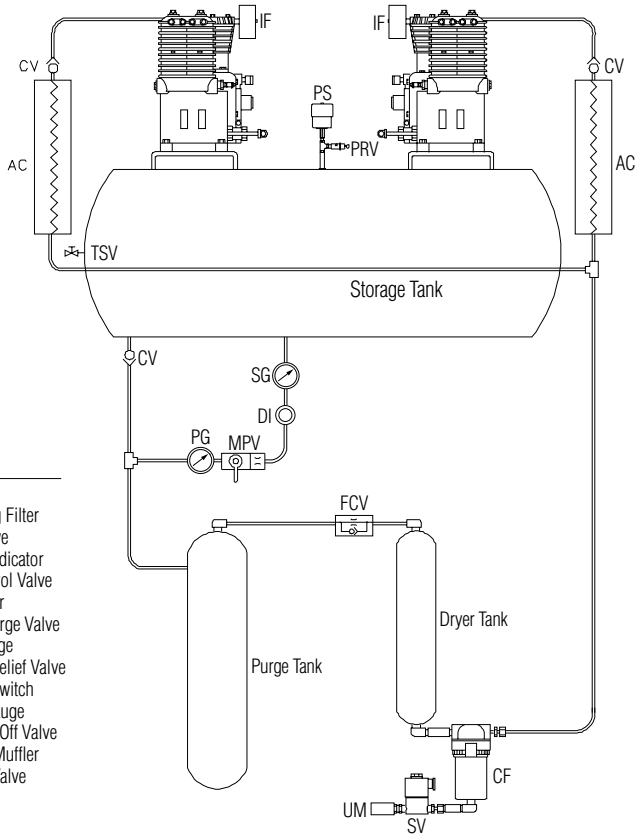
C. Maintenace Instructions:

The ADP King-Air Compressor will provide years of trouble-free, reliable service. Certain parts do require periodic attention and service. Failure to adequately service these parts will not only cause failure of your compressor, but will also result in unsatisfactory performance while it is running. See section of this manual entitled, "Replacement Parts List" for the correct replacement part numbers for each compressor model.

Repairs:

Refer all repairs to your local service department. Please have your compressor model and serial number ready.

Maintenance Procedure	Weekly	Monthly	Semi-Annually	Annually
Check Oil Level (s)	•••			
Check Drying System Moisture Indicator (Blue)	•••			
Empty Condensate Drain Condensation Pan (if used)	•••			
Check Entire Air System For Leaks		•••		
Clean/Dust Off Compressors And After Cooler (s)			•••	
Change Oil			•••	
Replace Air Intake Filter-Muffler (s)			•••	
Replace Coalescing Filter Element				•••
Inspect Suction/Discharge Valves				•••
Check Drive Belts For Tension				•••



Legend

AC - Aftercooler
CF - Coalescing Filter
CV - Check Valve
DI - Dryness Indicator
FCV - Flow Control Valve
IF - Intake Filter
MPV - Manual Purge Valve
PG - Purge Gauge
PRV - Pressure Relief Valve
PS - Pressure Switch
SG - Storage Gauge
TSV - Tank Shut-Off Valve
UM - Unloader Muffler
SV - Solenoid Valve

Lubricated Air Compressor System

Adding Oil:

Oil should be added only when oil level remains below the **"FULL"** line of the oil-level sight glass. To add oil, remove center pipe plug on crankease access cover. **Fill to red center bull's-eye of sight glass.** Replace fill plug.

DO NOT OVERFILL. If the crankcase is over-filled, the compressor will pump the excess oil into the system. Wipe OFF any spilled oil from the compressor. Oil collects dust and creates excessive heat.

CHECK OIL LEVEL WEEKLY
Lack of oil is a leading cause of compressor failure. Use SAE-30W non-detergent compressor oil only.

Changing Oil

The oil in the compressor should be changed at 6 month intervals. Place a drip pan or funnel under the drain plug (located at the lower end of the compressor head when facing oil sight glass and remove plug). Drain oil and replace drain plug. Add oil until level reaches the red center bull's-eye of the sight glass. See above instructions "ADDING OIL".

Draining Storage Tank

It is necessary to check monthly for water build-up in the storage tank. To drain the storage tank, open the bottom drain valve slowly with air pressure in the tank. Leave the drain valve open until all moisture has been blown from the storage tank. Close drain valve when finished. Water build up in the storage tank is not usually a problem with desiccant model compressors.

To eliminate the need to manually drain the storage tank, the Automatic Drain Valve (Part # ACA-AD1) is available. This valve attaches to the bottom or side of the storage tank and will allow the storage tank to drain automatically.

Condensate Draining

All ADP Desiccant Air Dryer Compressor models are equipped with two moisture removal components; the Coalescing Filter and the Silica gel Desiccant Drying Chamber. During the compressor shutdown automatic purge cycle, both the Coalescing Filter and the Drying Chamber release any condensate (oil and water) collected during the pump-up cycle. This condensate is expelled via a common drain line terminating at the exhaust muffler. If direct sewer line drainage with 6 ft. poly-flow tubing supplied is not utilized, a condensate drain pan should be place below the exhaust muffler. A considerable amount of moisture may be collected. **This Is Normal.** The condensate collection pan should be emptied weekly or as required.

Air Intake Filter-Muffler

A dirty air intake filter-muffler decreases the efficiency of the compressor and increases oil consumption. This muffler should be replaced every six months.

Coalescing Filter

The ADP Air Compressor contains a water and oil coalescing filter. On oil lubricated compressor systems, the Coalescing Filter removes 99.9% of any oil discharged by the compressor. Any oil vapor or mist allowed to enter the drying chamber would contaminate and render the drying system less efficient. **The filter element must be changed ANNUALLY** or when the indicator on the top of the housing stays **RED** during the pump-up cycle.

Pressure Switch

The compressor pump-up cycle is controlled by the opening and closing of the pressure switch contacts.

Note: Do not tamper with the adjustment settings as motor starter burnout may occur. Consult the factory or reset information if required.

PROBLEM: Compressor will not start.

Cause: Incorrect voltage.
Remedy: 1. Check for proper motor voltage and control circuit voltage.

Cause: Defective pressure switch.
Remedy: 1. Check that contacts are closed if tank pressure is below 75 psi. Replace if defective.

Cause: Circuit breaker or thermal overload tripped.
Remedy: 1. Check circuit breaker or thermal overloads. Manually reset if tripped. Replace if defective. Determine and correct source of overload.

PROBLEM: Compressor runs for a few seconds and shuts off.

Cause: Oil-pressure failure shutdown.
Remedy: 1. Check and maintain proper compressor oil level.
2. Check for proper oil pressure, 15 psi minimum. Replace oil pump if defective.

Note: RESET OIL FAILURE ELECTRICAL CONTROL CIRCUIT. To Reset oil failure "one shot" time delay circuit, the main power supply breaker or disconnect must be switched OFF and reset. Do not perform reset procedure more than twice. If oil pressure cannot be maintained, consult with the factory.

Cause: Circuit breaker or thermal overload trip.
Remedy: 1. Manually reset if tripped. Replace if defective. (Repeated overload tripping may be indicative of motor or compressor failure.)

PROBLEM: Compressor runs, but will not build up to 100 psi pressure.

Cause: Air leaks in compressor or system piping
Remedy: 1. Locate and repair leaks.

PROBLEM: Compressor runs, but will not build up to 100 psi pressure.

Cause: Unloader valve not closing on pump-up cycle. Leaks air to atmosphere at unloader muffler.
Remedy: 1. Check for 15 psi pilot oil pressure at top of unloader valve. (On SIMPLEX unit only)
2. Check for voltage to coil. (On DUPLEX unit only)
3. Remove unloader valve, disassemble, clean, and check for torn diaphragm.

Cause: Restricted air intake.
Remedy: 1. Clean or replace clogged air intake filter element.

Cause: Dirty, leaking or broken compressor valves.
Remedy: 1. Remove valve assemblies from head, disassemble and inspect for valve breakage, weak valve springs, nicked or scratched seal surfaces. Clean valve assembly and replace defective parts.

Cause: Slipping belts of V-belt drive.
Remedy: 1. Check for proper belt tension gauged by flexing the belt by hand to a distance equal to over-all belt thickness. Adjust to proper tension at motor end.

Cause: Low compression.
Remedy: 1. May be caused by worn piston rings. Replace all rings if excessive wear appears.

PROBLEM: Compressor cycles with air usage.

Cause: Manual purge valve in "ON" position.
Remedy: 1. Turn valve handle to the vertical "OFF" position.

Cause: Leak in office air system.
Remedy: 1. Close storage tank "shut-off" valve. If pressure is maintained for 15-20 minutes, leak is in air system not compressor unit. Locate and repair leak.

Cause: Leak in compressor air storage tank check valve.
Remedy: 1. Close storage tank "shut-off" valve. If pressure drops, tank check valve may be dirty or defecffve. Clean or replace check valve.

PROBLEM: Moisture indicator is pink "Wet Air" .

Cause: Unloading system not functioning properly.
Remedy: 1. Check that the purge (gauge) air is relieved on compressor shut-down cycle (100-0 psi).
2. Check unloader valve for any dirt that may cause sticking. Clean or replace.

Cause: Desiccant drying chamber is saturated.
Remedy: 1. Operate drying system in the manual purge "ON' mode for 3 to 5 days. Replace desiccant if not dry after 5 days.

Cause: Excessive compressor duty cycle operation.
Remedy: 1. Check for air leaks or undersizng of compressor.

Cause: Ultrair coalescing filter dirty or defective.
Remedy: 1. Replace ultrair element annually or as needed.

PROBLEM: Loud knocking noise.

Cause: Loose motor sheave or compressor flywheel.
Remedy: 1. Tighten retainer bolts and set screws.

Cause: Worn bearing: Piston pin, connecting rod, crankshaft.
Remedy: 1. Inspect for excessive "play". If worn or damaged, replace.

Cause: Loose valve assemblies.
Remedy: 1. Carefully tighten the hold down screws to secure the valve solidly in place.

PROBLEM: Excessive oil consumption

Cause: Compressor running in excess of 35% duty cycle (Time "On" - Time "On" + Time "Off").
Remedy: 1. Check for improper compressor selection sizing or air leaks.

Cause: Oil leaks.
Remedy: 1. Check for and repair any oil leaks.

Cause: Restricted air intake.
Remedy: 1. Clean or replace intake filter element.

Cause: Improper oil.
Remedy: 1. Use only SAE-30W non-detergent compressor oil.

Cause: Worn piston rings.
Remedy: 1. Check all rings for excessive wear. Replace if necessary.

Replacement Parts List

Description	Part Number
Compressor Oil (32 oz.)	ACA85925
Desiccant Material (Small)	ACA85340
Desiccant Material (Large)	ACA85337
Element - Ultrair Filter (M-26)	PFM85215
Element - Ultrair Filter (M-30)	PFM85207
Exhaust Muffler	PFM70900
Filter - Air Intake	PFM70920
Fuse - 4 Amp	EMS10920
Gauge - Air Pressure	PGA70425
Moisture Indicator Assembly	ACA85965
Oil Pressure Relay/Timer	EMS80500
Oil Pressure Sensor	PMS70970
Ultrair Coalescing Filter Assembly (M-26)	PFM85902
Ultrair Coalescing Filter Assembly (M-30)	PFM85900
Valve - Flow Control	PVV50577
Valve - Pressure Safety	PVV50560
Valve - Storage Tank Check (3/4" MPT x 1/2" FPT)	PVV50517
Valve - Solenoid 1/2"	PVV10473
Fuse - 2 Amp	EMS10925

Warranty Information:

- **2 Years**

All ADP products are thoroughly inspected and tested in accordance with rigid specifications and standards. Our products are guaranteed against any defective material and workmanship from the date of shipment; provided, that the installation, operation, and maintenance is done in accordance with ADP procedures as outlined in our Installation and Maintenance Guides. Warranty cards must be returned to ADP within ten days of installation to effect warranty. No other warranties or guarantees, expressed or implied are made.

ADP's obligation under the warranty is to provide parts for the repair or, at its option, to provide the replacement product (excluding labor). All special, incidental and/or consequential damages are excluded. We will not issue credit for product without first attempting to correct the problem in the field. Written notice of breach of warranty must be given to ADP within the warranty period. The warranty does not cover damage resulting form improper installation or maintenance, accident or misuse. The warranty does not cover damage resulting from the use of cleaning, disinfecting or sterilizing chemicals and processes. Failure to follow instructions provided in ADP's Installation and Maintenance Guides may void the warranty.